



**Good Practices** 

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Modal shift towards rail and inland waterways

# Modal shift towards rail and inland waterways

### 1.1 Description

The total demand for freight transport in Europe has increased significantly in recent decades, but it has mostly been handled by road transport (Islam, D. M. Z. et al., 2016). Freight transport can also be carried out by inland shipping or rail instead of by road, which would mean a change in mode of transport. This good practice has multiple benefits, which include benefits such as (VTPI, 2019, European Environment Agency, 2021, U.S. Department of Transportation, 2007):

- Reduction of traffic jams: Heavy trucks cause more congestion per mile travelled compared to lighter vehicles because of their size and slower acceleration. They make up a significant part of the traffic on routes like highways to ports and major industrial areas.
- Road maintenance cost savings: Freight trucks cause high levels of road wear. A heavy truck can impose road wear costs hundreds of times greater than automobile.
- Energy conservation and less pollution: Rail and waterborne transport have the lowest emissions per kilometre and unit transported, while road transport emit significantly more (see paragraph 'Realised/potential impact'). Heavy diesel trucks produce high levels of particulate air pollutants, which are particularly harmful to human health.
- Reduced crash risk: Although crashes for heavy trucks are relatively rare, they can cause significant damage to other road users when crashes occur. The crashes also have a relatively high average costs per crash, resulting in relatively high cost per vehicle-mile.
- Improved community liveability: Freight traffic can degrade community liveability by imposing noise, dust, air pollution, traffic risk and traffic delay. Espeicallym, in neighbourhoods near major highways or (inland) terminals. Reducing freight traffic can reduce these negative impacts on communities living nearby ports.
- Financial savings to shippers: Logistical improvements that increase freight delivery efficiently can provide financial savings to shippers.

The Netherlands received approval from the European Commission to spend 22.5 million Euros on a modal shift of freight traffic. The budget aims to encourage shippers and forwarders to use rail and inland shipping instead of road transport. A €20 subsidy is offered for each container or bulk shipment moved this way. More information on this programme can be found on Connekt Modal Shift programme. There have also been initiatives from the

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perspective of ports to support this good practice. The port of Strasbourg has hosted workshops together with shippers to put the focus on decreasing road transport and increasing inland and rail transport.

The port of Antwerp-Bruges is working towards a modal shift in freight transport that sees more freight transport happening in 2030 by rail, inland shipping and pipelines (Port of Antwerp Bruges, n.d.). When looking at container transport, the port of Antwerp-Bruges has the clear goal of 15% happening by rail, 42% happening by inland shipping, and 43% happening by road transport. The main disadvantage is that in Flanders, there is no subsidy system (unlike in the Netherlands). This makes it a lot more difficult to persuade stakeholders (Gerritsen, J. et al., 2024).

## 1.2 The aim of modal shift

The main goal is to make freight transport more sustainable. Today, transport emissions represent around 25% of the EU's total greenhouse gas emissions, and these emissions have increased over recent years. The European Green Deal includes the goal of cutting transport-related net greenhouse gas emissions by at least 55% by 2030, and 90% in 2050 (EC, 2022). The paragraph 'Realised/potential impact' shows that a logistic modal shift can make a big difference within this goal. The goal and timeline of the goal can vary for each country and even for each port. It can be in terms of CO<sub>2</sub>-reduction, but also in amounts of cargo (containers) that will be shifted from road to rail and/or water. For example, the goal of the Dutch modal shift programme, that has earlier been mentioned, was to realise a modal shift of 880,214 TEUeq (which means 144,464 tonnes CO<sub>2</sub>) between 2021 and 2023 (Modal Shift Programma, 2023).

### 1.3 Ports that focus on a modal shift

- Port of Strasbourg
- Port of Antwerp-Bruges
- Port of Rotterdam
- Compagnie Nationale Du Rhône (port of Lyon)
- Port of Detroit

### 1.4 Stakeholders

- The port authority: They can encourage shipping companies to put effort in creating a modal shift. Some port authorities (oftentimes the ones of the larger ports) monitor the modal split within the port, which helps to formulate clear goals. They are also responsible for the infrastructure that should be present to facilitate such a modal shift.
- The shipping companies: They play a key role within this good practice, as they are the ones that should adopt a modal shift. Shipping companies, including shippers, freight forwarders and transport operators, can be encouraged by port authorities to focus more

on modal shift and sustainability or they could be offered subsidies to move freight from road transport to rail or inland shipping.

 (Inter)national government: Around 25% of the EU's total greenhouse gas emissions are transport related. To reduce transport related emissions and to comply with (inter)national climate goals, governmental parties can offer subsidy to support shippers and forwarders to use more sustainable transportation methods.

### 1.5 Voluntary or mandatory

Voluntary. Subsidies are offered but this does not mean that shippers are mandatory to shift from road transport to rail/water transport.

# 1.6 Realised/potential impact

For comparison, CE Delft, (2021) shows that the average Tank-To-Wheel (TTW)  $CO_2$ -eq emissions for a truck with Gross Vehicle Weight (GVW) >20 tonnes with trailer are around 90 grammes per ton kilometre (g/tkm). For electric rail transport, the TTW  $CO_2$ -eq emissions are equal to 0 g/tkm. For diesel rail transport making use of extra-long (740 metres) trains, the TTW  $CO_2$ -eq emissions are still significantly lower than for road transport (between 13.4 and 24.3 g/tkm depending on the Gross Tonne Weight (GTW) and the weight of the cargo). For inland shipping, the TTW  $CO_2$ -eq emissions are also significantly lower than for road transport, as the emissions are between 13 and 60 g/tkm depending on the type of ship and the type and amount of cargo. 60 g/tkm only applies for very lightly loaded ships, while for the larger and more heavy ships, around 13 – 20 g/tkm is conventional. Table 1 gives an overview of the different relevant modalities and the  $CO_2$ -eq emissions.

Transport modality	CO2-eq emissions TTW
Truck GVW > 20 tonnes	90 g/tkm
Electric rail transport	0 g/tkm
Diesel rail transport (extra-long)	13.4 – 24.3 g/tkm
Inland shipping	13 – 60 g/tkm

Table 1 - Emission	factors for all relevant trans	port modes. Source: STREAM	l freiaht transport
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For the Dutch modal shift logistics programme, there was enough subsidy to realize a modal shift for 880,214 TEUeq, which equals a CO<sub>2</sub> Reduction of around 144,464 tonnes. Until 2023, around 20% of this potential has been realized, leading to an estimated CO<sub>2</sub> Reduction of 19,092 tonnes.

## 1.7 Possible obstacles

- There are multiple economic barriers to modal shift, such as high initial costs, limited infrastructure, a lack of government support in many countries, market distortions, high infrastructure costs, limited access and connectivity, etc (Toma, J. et al., 2023).
- When a cargo destinationis not located directly within the network, there will be additional pre- and post-transport activities and corresponding costs when using inland waterway transport, as an extra link has to be added within the network. It could also be possible that cargo needs to be stored for an extended period (Toma, J. et al., 2023).
- Truck traffic leads to door-to-door service that cannot be reached when shifting towards rail and barge transport (Aisha, T. A. et al., 2020).

#### 1.8 Key learnings

- Due to significantly lower emissions from rail transport and inland shipping, a large reduction of truck movements is possible, also diminishing the negative effects that are associated with freight transport.
- Shipping companies and forwarders are commercial parties that in general want to maximise profit. A subsidy would make the choice of modal shift more attractive. However, there are not many countries that offer such a subsidy. The Netherlands introduced a subsidy and has reported positive effects due to the modal shift programme.

#### 1.9 Sources

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